

Ciba-Geigy Corporation

McIntosh, Alabama

Region 4

ALD001221902

Site Exposure Potential

The Ciba-Geigy site, 1.3 km northeast of McIntosh, Alabama on the Tombigbee River, is adjacent to and north of the Olin Chemical Corporation site (Figure 1; see page 75 in this report). Ciba-Geigy manufactured only DDT when it began operations in 1952 but has since manufactured pesticides, plastic resins and additives, and water treatment chemicals. Solid wastes generated from manufacturing, construction, and other activities were disposed of on the site in many different areas. Process wastewater was stored in ponds (BCM 1990).

Surface water associated with the Ciba-Geigy site include Johnson Creek, which traverses the property in closed culverts, a reservoir, and a series of drainage ditches. Most of the surface water discharges to the Tombigbee River.

There are two separate aquifers at the site, alluvial and Miocene. The shallow, alluvial aquifer exists under semi-confined conditions and is recharged by infiltration from rainfall, streams, lakes,

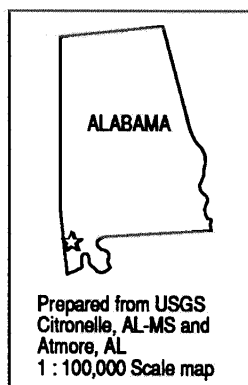
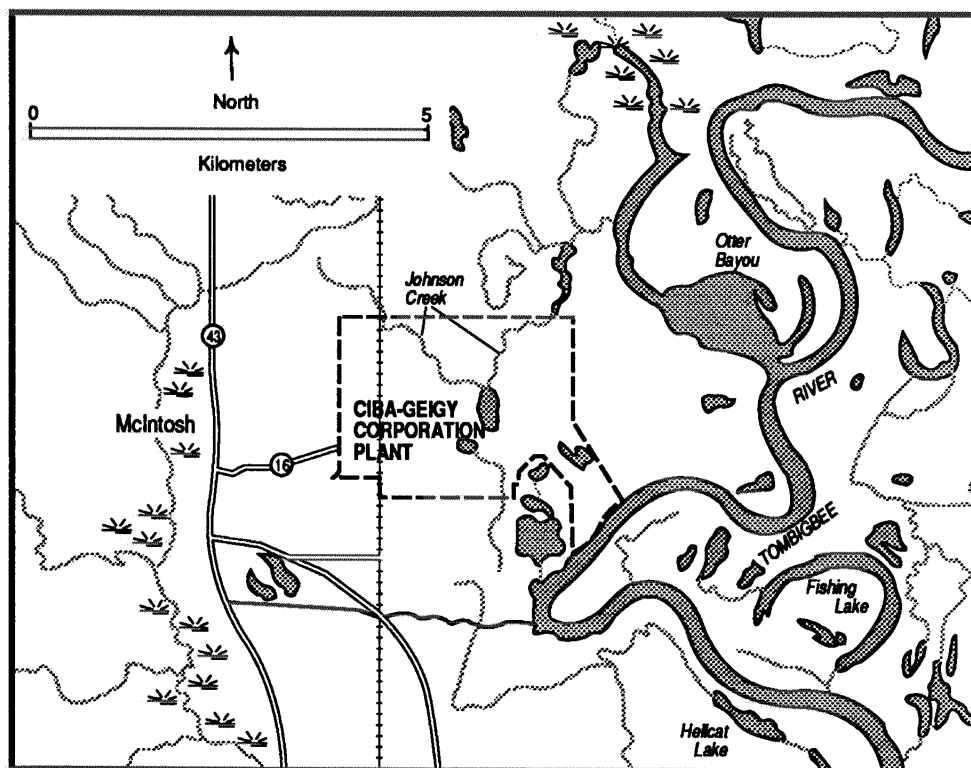


Figure 1.
The Ciba-Geigy
site, McIntosh,
Alabama.



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Site Exposure Potential, *cont.*

and marshes. Groundwater flow is generally to the southeast. Hydrogeologic investigations have established that the deeper aquifer is isolated from the shallow aquifer (USFWS 1986).

Surface water runoff or discharge and groundwater transport represent the primary pathways of contaminant transport from the Ciba-Geigy site. Contaminated sediments may act as a secondary source of toxic chemicals.

Site-Related Contamination

Past studies indicate that soil and groundwater at the site are contaminated with pesticides. Contaminants in surface water, soil, and sediment were analyzed as part of the RI/FS; maximum values reported are presented in Table 1 (BCM 1990). Although few data were presented in the final reports to characterize groundwater quality, corrective actions are being conducted to treat groundwater contamination at the site.

Table 1.
Maximum
concentrations of
major contaminants
found in
groundwater,
surface water, soil,
and sediment
collected at the site.

	Water			Soil		Sediment	
	Ground- water µg/l	Surface Water µg/l	AWQC ¹ µg/l	Soil mg/kg	Average U.S. Soil ² mg/kg	Sediment mg/kg	ER-L ³ mg/kg
INORGANIC SUBSTANCES							
chromium	<18	40	11	1500	100	78	80
copper	<12	29	12 ⁺	131000	30	30	70
lead	ND	27	3.2 ⁺	920	10	23	35
mercury	ND	ND	0.012	3.9	0.03	0.31	0.15
nickel	23	37	160 ⁺	670	40	32	30
zinc	91	250	110 ⁺	130	50	140	120
ORGANIC COMPOUNDS							
DDD	NT	ND	NA	26000	NA	40	NA
DDE	NT	ND	NA	30000	NA	26	0.002
DDT	NT	ND	0.001	24000	NA	40	0.001
α-BHC	NT	ND	NA	910000	NA	7.0	NA
β-BHC	NT	ND	NA	140000	NA	1.8	NA
δ-BHC	NT	ND	NA	15000	NA	0.52	NA
lindane	NT	ND	0.08	63000	NA	1.2	NA
endrin	NT	ND	0.002	ND	NA	0.03	0.00002
chloroform	240	0.02	NA	17000	NA	0.007	NA
chloro- benzene	590	0.12	50	12000	NA	0.22	NA
¹ : Ambient water quality criteria for the protection of aquatic organisms. Freshwater chronic criteria presented (EPA 1986). ² : Lindsay (1979). ³ : Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990). + Hardness-dependent criteria; 100 mg/l CaCO ₃ used. NA Screening level not available NT Not analyzed ND Not detected at method detection limit, detection limit not available							

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Site-Related Contamination, *cont.*

The majority of the pesticides contaminating the site were DDT and its metabolites and s-triazine herbicides. DDT and its metabolites were measured at extremely high concentrations in soils and were elevated in sediments above levels found to be associated with deleterious effects in aquatic organisms (Long and Morgan 1990).

Other contaminants present at the Ciba-Geigy site include trace elements and volatile organic compounds that were elevated in soils in areas associated with landfills or effluent ponds. Several metals measured in surface waters exceeded their freshwater chronic AWQC, including chromium, copper, lead, and zinc.

Herbicidal compounds were present at extremely high concentrations in soils throughout the site, but were not highly elevated in other matrices. No criteria or screening levels are available for evaluation of the potential impacts to aquatic resources by this class of herbicide. To determine concentrations of biological significance, levels of these herbicides in surface water, soils, and sediments are presented in Table 2 (BCM 1990). To provide some comparison values for surface water, values from the Chemical Information System database (CIS 1986) are presented. This database has compiled current studies for particular compounds, and provides values for acute or chronic toxicity to aquatic organisms. No comparison values were available for soil or sediment.

Table 2.
Herbicides and
insecticides at the
site, and the lowest
concentrations of
these chemicals
reported by CIS to
result in either acute
or chronic toxicity to
aquatic organisms.

	Water		Soil	Sediment
	Surface water µg/l	Effects µg/l	mg/kg	mg/kg
HERBICIDES/INSECTICIDES				
ametryn	35.5	1,000	68,000	4.7
atrazine	8.4	5,700	86,000	15.7
bladex	5.5	2,000	1,200	0.22
chlorobenzilate	ND	550	1,500	3.6
chloropropylate	91.7	NA	520	1.52
diazinon	58.1	0.3	37,000	0.4
galecron	3.5	13,200	750	2.4
methidathion	ND	14	47	ND
metolachlor	ND	NA	960	26.7
prometon	14.8	12,000	750	107
prometryn	14.0	1,000	4,300	0.13
propazine	12.7	NA	120,000	ND
simazine	5.1	10	3,000	27.1
simetryn	12.9	5,000	850	7.6
terbumeton	10.6	14,000	8,700	33
terbutryn	8.3	NA	40,000	0.19
terbutylazine	90.5	NA	12,000	5.2
tolban	105	NA	15,000	37.2
NA	Screening level not available			
ND	Not detected at method detection limit, detection limit not available			

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NOAA Trust Habitats and Species

Table 3.
Species and habitat
use in the
Tombigbee River
near the site.

The habitat of primary interest to NOAA is the Tombigbee River, which provides essential habitat for many freshwater and anadromous species (Table 3; USFWS 1986; Mettee et al. 1987; Mettee personal communication 1990). The site is approximately 96 km upstream from the river mouth. Although the river is usually freshwater at this point, during periods of low flow (August through September), saltwater intrusion along the river bottom may extend at least as far as the site (Mettee personal communication 1990).

Species		Habitat		Adult Forage
Common Name	Scientific Name	Spawning	Nursery	
ANADROMOUS/CATADROMOUS FISH				
Atlantic sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>		♦	♦
Alabama shad	<i>Alosa alabamae</i>			♦
American eel	<i>Anguilla rostrata</i>		♦	
striped bass	<i>Morone saxatilis</i>	♦	♦	♦
FRESHWATER FISH				
alligator gar	<i>Lepisosteus spatula</i>			♦
shovelnose sturgeon	<i>Scaphirhynchus sp*</i>			♦
ESTUARINE/MARINE Fish				
bay anchovy	<i>Anchoa mitchelli</i>			♦
striped mullet	<i>Mugil cephalus</i>			♦
Invertebrates				
blue crab	<i>Callinectes sapidus</i>	♦	♦	♦

* undescribed species of *Scaphirhynchus*

The Tombigbee River near the site is within the Mobile River delta zone and historically has served as habitat for at least four anadromous or catadromous species: Atlantic sturgeon, Alabama shad, American eel, and striped bass. Alabama shad were common in the 1940s, but have not been observed inland in the Mobile River system since the early 1970s (Mettee personal communication 1990). Sturgeon also used the river for spawning and nursery habitat, but have not been observed in upstream areas of the river in decades, although dead specimens have been found at the mouth of the Mobile River within the last year (Mettee personal communication 1990). Striped bass have been observed upstream of the mouth of the Mobile, but it is unclear whether

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NOAA Habitats and Species, *cont.*

they currently occur near the site. The Alabama Department of Natural Resources stocks the Mobile River with approximately 20,000 bass each year, below its confluence with the Tombigbee. Estuarine species, such as the bay anchovy, have been observed in the Tombigbee near the site. The inland occurrence record for bay anchovy (434 km) was set in the Mobile system, and suggests a reproductive, freshwater stock somewhere within the system (Mettee personal communication 1990). Blue crab support a recreational fishery. Saltwater species have been reported by locals during periods of low river flow, including southern flounder, hogchoker, and Atlantic needlefish.

Several freshwater fish species have been sampled near the site, including largemouth bass, rock bass, bluegill, freshwater mullet, and channel catfish (USFWS 1986). Channel catfish is the most important commercial species in the lower Tombigbee. An extremely rare, as yet undescribed, freshwater species of shovelnose sturgeon has been sampled within the Mobile River system (Mettee personal communication 1990).

References

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